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of a heavy wood, *cumarú;* it is two fingers thick and as much as 80 cm. long (fig. 4, *a*), and with it they crush and mill the material in a long semicylindrical trough (tau/ta'), sometimes open at both ends. In this hod they often work with a short wooden pestle; I saw one which ended at the top in a sculptured human head. 412

The cook shed is also the place where they make dry manioc flour, *farinha de mandioca,* which is probably the Tukuna product most desired by the Neobrazilians today. Formerly, the Tukuna did not know how to use it, but for dry flour substituted *beijú,* a thin flat cake of fermented manioc dough baked on a clay slab. They also had a flour made of maize cracked by the heat of fire,* which went by the name of a/të'ë and was eaten with bananas. 252

The Neobrazilians probably taught the Tukuna how to make manioc dry flour, since so many of the Tukuna terms relating to it are Neobrazilian, for instance, the name of the product, ʊ:'i (l.g., *uí*), and of the utensils used in its manufacture: e.g., yapu'na, oven (l.g., *yapúna*), te'piti, press (l.g., *tipity*), kuču, hod for the dough (P., *cocho*). [177]

I do not know what shape the earlier grater had; today it is invariably made of a punctured sheet of metal. There are still small graters which are made from the aerial root of the *paxiubinha,* and others made from the bony part of the tongue of the pirarucú, but they are no good for grating manioc roots; they are useful only in the preparation of certain medicines. 412

Like any other load, the manioc roots are brought from the garden patch in large conical baskets (pl. 4). These are made by the men—who, however, never use them—in an open-mesh technique, usually of split *cipó,* more rarely of uarumã stems. The Tukuna say that they learned to make this type of basket (vɔ'tura; Tupi, *waturá*) from the Omágua, who then made war against the Tukuna for copying an Omágua article. Formerly the Tukuna baskets were cylindrical, with a square bottom. All are carried with a tumpline of envira. Baskets of both types are in use today, although the first type predominates. 285 [482] [462] [177] [482]

Aside from these carrying baskets, the Tukuna also have a large woven bag, ñë'/rį, closed by a drawstring passed through the mesh row of the opening; it often has a tumpline woven of the same material (pl. 7, *e*). This bag, *puçá,* with the mouth held open by a hoop of cipó or of elastic wood, also serves as a dip net. It is mentioned in the legend of the origin of culture heroes as one of two articles typically used by women and is one of the elements which the Tukuna share with the cultures of eastern Brazil and the Chaco. 415 [227] [171]

Formerly, the Tukuna peeled manioc roots with the edge of a large bivalve shell, koru, common along the Solimões. This is used even today to scrape pineapples for the preparation of a cooling drink. 417 252 [272]

For soaking bundles of manioc roots in plain water the Tukuna invariably use an old canoe near the entrance to the house. The squeezed pulp from the press (tipity) is placed in a hod, open at both ends and set slightly inclined on two sawhorses. Nowadays, the Tukuna make "dry" farinha just as much as "wet"; they rarely bother with tapioca. The pulp is strained through square, large-meshed sieves made of strips of bamboo, *taboca,* or uarumã (ʊ:'i-čim∫/∫ⁿn).

For other purposes there is a small fine-meshed sieve, va'ira-čin∫/∫ⁿn (*vdira,* 412

* The word for popcorn, *pipocas,* was not used here.—Trans.

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the wild state by the first men, who raised them in their houses. Even today the Tukuna raise very few chickens, since they dislike their dirtying up the house or yard. Their forefathers had an aversion to the flesh but ate the eggs. Of the present generation no one refused to eat chicken with me, but in general they raise them only for sale to the Neobrazilians.

The plague of blood-sucking bats forces the poultry raisers to keep their wards almost always locked up at night in well-closed henhouses. These are generally conical in shape; one that I saw even had a veranda! Ducks, which are not very numerous, were recently introduced, as their name "pa'tu" (P., *pato*, duck) indicates.

With the exception of large mammals and birds of prey, the Tukuna occasionally raise at home the young of almost every species of wild animal that falls into their hands. These animals, all of which have the run of the place, generally stay only a short time in the possession of their original captors, since they are greatly sought after by the Neobrazilians. Others, upon becoming adult, turn wild or almost wild, coming and going at will from house to jungle and back again; they are given food, but no attempt is made to recapture them.

Every year, in the winter, the women and children are in the habit of raising the young of a marmoset called *leãozito* (little lion)[28] by the Neobrazilians. Sometimes two or three may be observed clinging to the hair of their mistress, who thus carries them wherever she goes, giving them masticated food from her own mouth. During the night she shelters them in a conical basket, woven in an openwork technique; it is suspended with the bottom down and is covered with tururí bark cloth, the round entrance being plugged up with a bit of rag. Although these tiny creatures cannot be raised outside this region, they are much coveted by civilized persons.

Fishing

Fishing is the principal occupation of the men, who rarely let a day pass without indulging in it. A boy is taught to fish, from childhood, accompanying his father in the canoe and maneuvering it at his command. Even at the age of six, both boys and girls pass long hours alone in the igarapé or igapó in the small canoes their fathers make for them. At the age of nine or ten many boys are already able to provide the household with the fish required.

The equipment consists of the fishhook, javelin, arrow, harpoon, and arrow-harpoon. According to Tessmann, bone fishhooks were formerly used. I did not succeed in getting data from my informants on this point. They were able to tell me only that in the old days the children used to fish for small fry with the mandibles of the *taóca* army ants (*Eciton* sp.), called vɔ'/čata in Tukuna. If this is true, then the fish certainly must have been only very tiny and of no economic value.

However, the fishhook (pɔ'/va) figures in the legend of the culture heroes as the property of a demon much older than they (see p. 126). Nowadays the Tukuna do not go off in their canoes without taking one or more reeds with fishhooks of various sizes with which to experiment as soon as they arrive at a propitious place.

[28] Also called *leoncito*, *saguim leãozinho*, and *chichico* (*Cebuella pygmaea pygmaea*, Spix).—Trans.

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227 The javelin (čʊ/ĕi) is a length of canna brava some two meters long and having
[177] from four to nine points; it was formerly made of smooth wood, today it is made
of iron wire with a barbed point. The traders on the banks of the Solimões complain
[618] bitterly of the Tukuna for unceremoniously filching the wire from their fences in
order to make these spear points, but they are too unbusinesslike to order rolls of
this wire to sell retail to the Indians at a good profit.

226 The fisherman casts the javelin, holding it by its butt end. This procedure always
gave me the impression that the javelin was the weapon reproduced in the atlas of
Spix and Martius, that was formerly thrown with the *estoleca* (atlatl); but no one
remembers it today. With the javelin in the right hand,
and the paddle held close to the blade in the left hand, the
fisherman guides his canoe under the shadow of the trees,
silently and slowly.

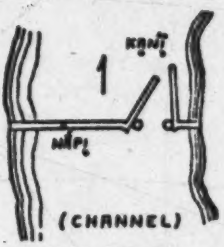

Fig. 5. Fish weir.

151 The ability of the Tukuna to discover fish in the depths
226 or at the bottom is truly extraordinary and can only be
explained by their spending almost half their time since
childhood in this activity. If, while traveling, the Indians
pass by a spot that looks promising, they constantly hurl
the javelin ahead of the canoe and retrieve it, where the
untutored eye sees no sign of fish. The children especially
may be seen fishing in this manner and in advantageous places where they do not
overlook the slightest possible chance.

226 Especially vulnerable to the javelin are the shoals of fish which swarm up the
Solimões in fantastic numbers and enter the tributaries to spawn during May and
June. In the river narrows formed by the crumbling and falling of the solid banks,
the fish crowd together in such a way that any cast will bring results.

227 Far less used for fishing than the javelin is the bow and arrow. The arrow
(na:/nĕ) is a length of canna brava, without feathering and with a barbed point,
formerly made of the bone of a sloth (*Bradypus* sp.), nowadays of iron, super-
imposed on a wooden foreshaft.

The fisherman also often takes with him a reed with a small ball of bone, wax,
or heavy wood attached to the end of the line (T., kuiⁿë/j̈ⁿn̈; l.g., *uapunga*). With
[226] the ball he strikes the surface of the water, thus imitating the fall of fruits, in order
to attract certain fish—especially *tambaquís* (*Colossoma bidens*) and *pacú* (*Mylcles*
sp.)—if he does not obtain the same results by tossing the fruit itself.

The arrow harpoon (T., vj̈rëë'nĕ; l.g., *sararáca*), which today has a barbed
iron point or, if used for turtle (*Emys tracaja*), four spikes, has been in use since
[177] ancient times, but not the long-shafted wooden harpoon which, in my opinion,
was adopted only after the Tukuna began to inhabit the banks of the Solimões.
There it is employed especially in fishing for pirarucú, the principal, and for some
of the Solimões Tukuna the only, staple food, as well as an important article of
export.

226 At the mouths of the numerous lake channels and at the dead-end arms of the
lower courses of the igarapés one almost always finds a weir, *tapagem* (na:'/pį)
constructed of bamboo strips. Where it extends close to one of the banks there is
an opening between two posts with a movable door (ko'nį̈ⁿ) of paxiuba shoots tied

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CULTURE

SUBSISTENCE ACTIVITIES

241 **Farming.**—The main *Tucuna* crops are bitter manioc, sweet manioc (macaxera), cara (*Dioscorea*), and maize. The last is planted with some ceremony. There are also at least three species of edible tubers which are not used by civilized people.

226 227 **Fishing and hunting.**—Fish, of great importance to the *Tucuna*, are taken with four- to nine-pronged javelins, arrows, harpoon arrows, baskets, weirs, traps, and a drug made of timbó. The Indians fish almost daily from childhood. On the Solimões, they are expert fishers of pirarucú, an important article of commerce.

224 177 411 Hunting today is unimportant, since game has been depleted to fill the demand for hides. The *Tucuna* now use firearms, but formerly employed the bow and arrow, spear, and blowgun. They also use pitfalls and several types of snares and traps. The blowgun, once the principal weapon, is disappearing.

222 262 [245] **Gathering.**—The wild burity, bacaba, patauá, and açahy palms are of great economic value. Some *Tucuna* plant Brazil nut trees near their houses. They eat certain frogs, Coleoptera larvae, and female red ants at hiving time. They like wild honey but keep no bees.

231 **Domesticated animals.**—The *Tucuna* raise a few chickens, but do not want hogs or other domestic animals because they dirty the premises. They keep young wild mammals and birds uncaged.

412 252 [177] [434] **Food preparation.**—Instead of a mortar, the *Tucuna* use a trough with a half-moon-shaped rocker of thick and heavy wood. The making of manioc flour, introduced by the Neo-Brazilians, became one of the principal sources of income among the *Tucuna*.

HOUSES

342 The old houses had a small rectangular central portion with a short ridge pole mounted on props. Each end was semicircular, so that the ground plan was oval or nearly round. The walls were of a man's height, and were made of boards of paxiuba or of straw. The house could be sealed tight against mosquitoes. Families occupied the lateral corridors, the central space being reserved for ceremonies. All houses were spacious and well built.

177 342 352 513 The introduction of mosquito nets made house walls unnecessary. People slept on bunks along the walls, covered with mosquito nets, instead of in hammocks. Many houses were built without the semicircular extremities but with a longer central part, being like an open rectangular ranch house with a ridge pole. When the tribe occupied the flood plains of the shores and islands, they built houses on piles.

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MAN

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ORIGINAL ARTICLES.

America, South: Technology. With Plate L. Rydén.

Notes on a Knitting Technique from the Tukuna Indians, Brazil. *By Stig Rydén, Gothenburg (Göteborg) Museum, Sweden.*

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286 In a collection from the Tukuna (Ticuna) Indians, acquired by the German-born Brazilian explorer Curt Nimuendajú in 1929 on Rio Solimões for the Gothenburg Museum, are, *inter alia*, preserved two carrying-nets (Figs. 1 and 3) (Nimuendajú, Curt: *Besuch bei den Tukuna-Indianern*, Ethnologischer Anzeiger Bd. II: 4, Stuttgart, 1930, sid. 188). In one of these nets (Fig. 1) the mouth is kept open with a narrow wooden branch bent into a circular hoop, while in the other (Fig. 2) no such arrangement is found, but a cord for carrying is provided instead. Both nets are manufactured of vegetable fibre, and the knitting technique employed is seen in detail in Fig. 2. The Tukuna collection also includes a partly finished carrying-net (Fig. 4). From this unfinished piece of work it is evident that the loops were formed by means of a bone needle on a thin sliver of uniform thickness, probably cut out from the skin of the petiole of a palm leaf. The sliver is allowed to remain in the net until the knitting is completed, whereupon it is broken up and removed. The presence of this uniformly thick sliver ensures that the loops of the net are all turned out even-sized. In this case the sliver performs a function corresponding to that of a mesh gauge, and the retention of the sliver in the meshes while knitting is going on tends to make the net more easily handled as the work continues. The method of forming the loops on the sliver will be apparent from Fig. 5.

286 227 171 Koch-Grünberg (*Zwei Jahre unter den Indianern*, Berlin, 1909-10, Part II, Figs. 12, 13, p. 39) depicts a number of fishing implements from Rio Aiáry, in Brazil, where the same knitting technique has been employed as in the carrying-nets of the Tukuna. These fishing implements are designed for catching small fish and crabs, and consist of a more or less circular net kept open by means of a bent twig. These smaller-sized fishing nets are, in contradistinction from the larger variety, among the Rio Aiáry Indians always woven in the technique just referred to. As to the method employed in the weaving of these nets nothing is mentioned by Koch-Grünberg. It may, however, be supposed that they were manufactured by the same method as were the carrying-nets of the Tukuna tribe. For it may be noted that Koch-Grünberg in the same connection illustrates a "network basket" for crab-fishing, and in this basket the sliver is still left in the finished article, that is to say, the knitting technique is identical with that of the Tukuna net prior to the breaking up of the sliver.

171 Already in the earliest treatise known to me on South American knitting technique, a brief essay published by P. Radin in 1906 (*Zeitschrift für Ethnolo[illegible]* and 38, Berlin, 1906, p. 938), the author's attention is turned to the technique here dealt with. At that time very little authentic material was available, and scantier still were data as to methods of manufacture. Thus he supposes that in the knitting *two* slivers were used, one that was pushed in for the purpose of securing in their places the loops already formed, and another for determining the size of the loops.

171 285 It is not impossible that the knitting technique here described constitutes a development of a certain basket-weaving method, viz., the so-called coiled basketry technique. Especially striking is the similarity between this knitting technique and the variant of coiled technique that occurs in